REMARKS/ARGUMENTS

Claim 60 is amended to correct typographical errors (not for patentability reasons); claims 44-47, 50-58, and 66-73 are canceled; and claims 84-101 are newly added. Claims 43, 48, 49, 51-57, 59-65, and 74-101 are now pending in the application. Applicants respectfully request reexamination and reconsideration of the application.

Claims 43, 48, 49, 51-57, 59-65, 68, and 74-83 were rejected under 35 USC § 112, second paragraph, as indefinite on the grounds that it is not clear whether the claims are directed to a tested semiconductor device or a probe card assembly or both. Applicants respectfully traverse this rejection.

The subject matter of each of the claims is expressly stated in the preamble as "[a] tested semiconductor device" (which, incidentally, is not limited to a wafer but could be, for example, one semiconductor device singulated from the wafer (see, e.g., claim 48)). The claims are, therefore, expressly directed to a tested semiconductor device—not a probe card assembly or a combination of a probe card assembly and a tested semiconductor device.

Indeed, Applicants are not attempting to do what is forbidden Ex parte Lyell, 17 USPQ2d 1548 (Bd. Pat. App. & Inter. 1990), which was cited in the Office Action. Unlike the claims in the present application, the claims in Ex parte Lyell where expressly directed to both an apparatus and a method of using the apparatus. That is, the claim preambles in Ex parte Lyell expressly directed the claims to "[a]n automatic transmission tool in the form of a workstand ***and*** method for using same." Ex parte Lyell, 17 USPQ2d at 1549 (emphasis added). In contrast, the preambles of the claims in the present application are expressly directed only to a "tested semiconductor device."

Moreover, there is no prohibition against claim language that describes a step in a method as utilizing a particular apparatus. (See § MPEP, pg. 2001-217 to pg. 2001-218, paragraph entitled "Board Held Step Of 'Utilizing' Was Not Indefinite" (citing an example in which a method claim with a step of utilizing a nozzle having a particular structure was definite).) Therefore, the claims in the present application are not indefinite merely because they include a step that utilizes a probe card assembly that has a particular structure.

For all of the above reasons, the rejection under 35 USC § 112, second paragraph, should be withdrawn.

Claim 60 was further rejected as indefinite due to typographical errors. Claim 60 has been amended to correct the typographical errors and is now definite.

Claims 43, 48, 49, 51-57, 59-65, 68, and 74-83 were also rejected under 35 USC § 102(b) as anticipated by or, in the alternative under 35 USC § 103(a) as obvious in view of, US Patent No. 5,285,082 to Axer et al. ("Axer") because the tested semiconductor devices in Axer are allegedly indistinguishable from the tested semiconductor device that is the subject matter of the claims of the instant application. Applicants respectfully traverse this rejection.

As correctly noted in the Office Action, all of the pending claims are product-by-process claims. Consequently, the claims are patentable if the product—that is, the tested semiconductor device—patentably differs from prior art semiconductor devices (e.g., the semiconductor device disclosed in Axer). As discussed below, the tested semiconductor device of claims 43, 48, 49, 51-57, 59-65, 68, and 74-98 will have smaller and more uniform gouge marks on its bond pads than a prior art semiconductor device will have on its bond pads, and this is an advantageous and patentable difference.

The dies of a semiconductor wafer are often tested by bringing bond pads on the dies into contact with probes of a probe card assembly. Figure 5 of this patent application illustrates an example of a wafer 508 with bond pads 526 and a probe card assembly 500 with probes 524. Dies of the wafer 508 are tested by bringing the bond pads 526 into contact with the probes 524. Typically, the bond pads 526 are pressed against the probes 524 in order to establish relatively low resistance electrical connections between the probes 524 and the bond pads 526. Test signals are then passed to and received from the dies through the probes 524.

Gouge marks on bond pads of a semiconductor die have at least three potentially detrimental effects. First, gouge marks may prevent a wire from being bonded to a bond pad. (The bond pads of a die are often connected to a die package by wires.) Second, even if a wire is successfully bonded to a bond pad, a gouge mark may decrease the effective life of the bond between the wire and the bond pad. Third, a gouge mark may weaken a bond pad, causing the bond pad to loosen or even detach from a die. (See U.S. Patent No. 5,506,499 to Puar ("Puar"), col. 2, lines 21-40 and col. 3, lines 7-25. A copy of Puar is submitted herewith.) The larger the gouge mark on a bond pad, the more pronounced the foregoing detrimental effects are likely to be.

Independent claim 43 includes a step of providing a probe card assembly that includes "a moveable element disposed to alter an orientation of said probe substrate with respect to said probe card," and independent claim 82 includes "means for altering an orientation of said probe substrate with respect to said probe card." Importantly, because the moveable element of claim 43 and the means for altering of claim 82 allow the planarity of the probe elements to be adjusted to more closely align with the planarity of the electrical contact terminals (e.g., bond pads) of the semiconductor devices to be tested, the use of such a moveable element or altering means results in a smaller gouge mark on the electrical contact terminals (e.g., bond pads) of the semiconductor device. (It should be apparent that adjusting the planarity of the probe substrate relative to the probe card also adjusts the probe substrate—and thus the probes—relative to any other structure, including the wafer.)

Thus, there is a difference between the tested semiconductor device of the claims of the present invention and prior art semiconductor devices: the gouge mark caused by probe testing the semiconductor device of the present claims will be smaller than the gouge mark in a prior art semiconductor device. (It should be noted that Axer does not mention gouge marks on the bond pads of its semiconductor device much less disclose reducing gouge marks caused by probes during testing of the semiconductor device.)

And as discussed above, this difference—smaller gouge marks—gives the tested semiconductor device of claims 43, 48, 49, 51-57, 59-65, 68, and 74-98 significant advantages over a prior art semiconductor device (e.g., Axer's semiconductor device). For example, the smaller the gouge mark, the more readily the wires that connect the bond pads to the device's packaging attach to the bond pads. As another example, such wires are more likely to remain attached to the bond pads over the life of the semiconductor device if the gouge marks are smaller. As yet another example, larger gouge marks may so weaken a bond pad that it becomes unusable because it detaches from the semiconductor device or loses electrical connection with the semiconductor device.

In the Office Action of July 25, 2003, among other rejections, claims 43-48, 50-55, 59-61, 63, 64, 66-69, and 71-74 were rejected under 35 USC § 102(b) as anticipated by US Patent No. 3,939,414 to Roch ("Roch"). The claims as now pending patentably distinguish over Roch for at least the following reasons.

Independent claim 43 states that the probe substrate has "a plurality of probe elements." Roch's probe test unit 21 (which was equated with the probe substrate of claim 43) includes only one tip 29 (which was equated with the probe elements of claim 43). Thus, Roch's probe substrate (test unit 21) includes only one probe (tip 29) but does not include "a plurality of probe elements" as required by claim 43. Claim 43 therefore differs from Roch.

Moreover, the foregoing difference is not trivial but provides significant advantages not found in Roch. For example, because the probe substrate of claim 43 includes "a plurality of probe elements," the moveable element of claim 43 is able to planarize the probe elements *en masse*. That is, the moveable element of claim 43 may be used to planarize all of the probe elements attached to the probe substrate at once. In Roch, on the other hand, each probe element (tip 29) must be planarized individually. Claim 43 thus represents an improvement over Roch and therefore is not obvious in view of Roch. Independent claim 43 is therefore patentable over Roch.

Claims 48, 49, 51-57, 59-65, 74-81, and 93-101 depend from claim 43 and are therefore also patentable over Roch. Moreover, claims 48, 49, 51-57, 59-65, 74-81, and 93-101 recite additional features that further distinguish over Roch.

For example, claim 96 states that each probe element of the probe substrate comprises a spring and the probe elements thus provide individual compliance with respect to the contact elements of the semiconductor device. For example, because the probes are individual springs, the probes are able to accommodate differences in the individual heights of the contact terminals (or bond pads)of the semiconductor devices. While the probe elements thus provide individual compliance with respect to the contact terminals of the semiconductor device, the moveable element provides global planarization of the probe elements with respect to the contact terminals of the semiconductor device. Claim 96 thus provides both a local or individualized compliance (due to the fact that the probes are individual springs) and a global or *en masse* planarization of the probes with respect to the contact terminals of the semiconductor devices. No such features are found in Roch.

As another example, claim 98 states that the "electrical connections" that electrically connect the probe card with the probe substrate "pass through said interposer." No such electrical connections pass through Roch's housing 22 (which was equated with the interposer of what is now claim 98).

As yet another example, claim 100 states that "said compliant electrical connection comprises springs configured to exert a first force against said probe card and a second force against said probe substrate." Because the compliant electrical connection of claim 100 comprises springs that exert forces against the probe card and the probe substrate, the compliant electrical connection of claim 100 need not be soldered or otherwise secured to the probe card or the substrate but may be kept in place merely by the spring forces. Roch's cables 28, on the other hand, exert no forces against the ring assembly 11 or the probe test unit 21 and thus must be soldered or otherwise secured to the ring assembly 11 and the probe test unit 21.

Claim 101 further states that "said springs of said compliant electrical connection are electrically conductive and provide said electrical connections between said probe card and said probe substrate." Again, Roch includes no such teaching.

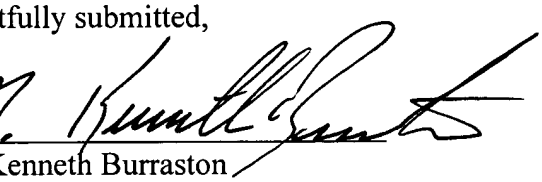
For all of the foregoing reasons, dependent claims 48, 49, 51-57, 59-65, 74-81, and 93-101 further distinguish over Roch.

Independent claim 82 and the claims that depend from claim 82 (claims 83-92) include features that are similar to the features discussed above with respect to independent claim 43 and the claims that depend from claim 43. Claims 82-92 therefore also patentably distinguish over Roch.

In view of the foregoing, Applicants submit that all of the claims are allowable and the application is in condition for allowance. If the Examiner believes that a discussion with Applicants' attorney would be helpful, the Examiner is invited to contact the undersigned at (801) 323-5934.

Respectfully submitted,

Date: November 8, 2004

By 
N. Kenneth Burraston
Reg. No. 39,923

Kirton & McConkie
1800 Eagle Gate Tower
60 East South Temple
P.O. Box 45120
Salt Lake City, Utah 84111-1004
Telephone: (801) 323-5934
Fax: (801) 321-4893